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Patent Abstracts of Japan

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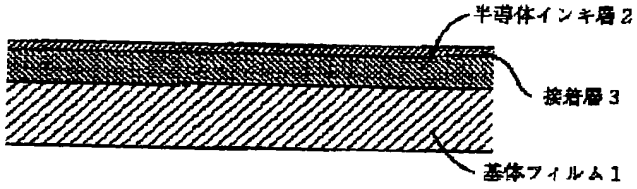
APPLICANT : NISSHA PRINTING CO LTD;

INVENTOR : TANIGUCHI TADATAKE;

INT.CL. : H01L 31/04 B41C 1/18

TITLE : ADHESIVE MATERIAL FOR SOLAR BATTERY



ABSTRACT : PURPOSE: To obtain an adhesive material for solar battery, in which a semiconductor ink layer of a uniform thickness can be formed on a glass substrate having a cubic surface such as curved surface.

CONSTITUTION: A polyethylene terephthalate film is used as base material film 1 and a semiconductor ink obtained by mixing of CdS/ CdTe as II-VI compound semiconductor powder together with solvent in a resin binder composed of acrylic resin is used on the base material film so that a semiconductor ink layer 2 is provided by screen printing method. Further, an acrylic adhesive is provided as bonding layer 3 on the semiconductor ink layer so that an adhesive material for solar battery is manufactured.

PATENT ABSTRACTS OF JAPAN

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(21)Application number : **03-276912**
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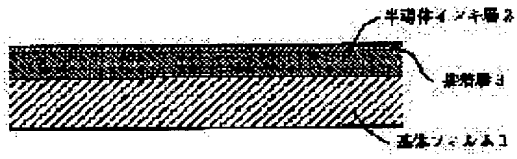
(71)Applicant : **NISSHA PRINTING CO LTD**
(72)Inventor : **TANIGUCHI TADATAKE**

(54) ADHESIVE MATERIAL FOR SOLAR BATTERY

(57)Abstract:
PURPOSE: To obtain an adhesive material for solar battery, in which a semiconductor ink layer of a uniform thickness can be formed on a glass substrate having a cubic surface such as curved surface.
CONSTITUTION: A polyethylene terephthalate film is used as base material film 1 and a semiconductor ink obtained by mixing of CdS/ CdTe as II-VI compound semiconductor powder together with solvent in a resin binder composed of acrylic resin is used on the base material film so that a semiconductor ink layer 2 is provided by screen printing method. Further, an acrylic adhesive is provided as bonding layer 3 on the semiconductor ink layer so that an adhesive material for solar battery is manufactured.



LEGAL STATUS

[Date of request for examination]

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[Date of final disposal for application]

[Patent number]

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CLAIMS

[Claim(s)]
[Claim 1] Pasting material for solar batteries characterized by preparing at least the semiconductor ink layer which makes a principal component II-VI group compound powder and a resin binder on a base-material film.
[Claim 2] Pasting material for solar batteries according to claim 1 by which the conductive layer is prepared in one side or both sides of a semiconductor ink layer.
[Claim 3] Pasting material for solar batteries according to claim 2 in which a conductive layer has a ctenidium-like pattern.
[Claim 4] Pasting material for solar batteries according to claim 2 with a transparent conductive layer.
[Claim 5] Pasting material for solar batteries according to claim 1 to 4 in which the glue line was prepared as a layer which faces the stuck body.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the pasting material for solar batteries which can form the semiconductor ink layer of uniform thickness on the glass substrate which has solid front faces, such as a curved surface.
[0002]
[Description of the Prior Art] A semiconductor layer is put by the electrode of a couple and a solar battery transforms the light energy from the sun into electrical energy.
[0003] In order to have manufactured the II-VI group compound semiconductor solar battery from the former, semiconductor ink was used on the conductive layer used as the electrode formed in the glass-substrate front face, direct printing formation of the semiconductor ink layer of uniform thickness was carried out with screen printing, by calcinating a semiconductor ink layer after that, the organic component was vaporized and the semiconductor layer was formed.
[0004]
[Problem(s) to be Solved by the Invention] However, in print processes, such as screen-stencil, it was difficult to form a semiconductor ink layer on the glass substrate which has solid front faces, such as a curved surface.
[0005] Therefore, this invention aims at offering the pasting material for solar batteries which can form the semiconductor ink layer of uniform thickness on the glass substrate which has solid front faces, such as a curved surface.
[0006]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, the pasting material for solar batteries of this invention was constituted as the semiconductor ink layer which makes a principal component II-VI group compound semiconductor powder and a resin binder was prepared at least on the base-material film.
[0007] In the above-mentioned composition, a conductive layer may be prepared in one side or both sides of a semiconductor ink layer.
[0008] In the above-mentioned composition, the conductive layer may have the ctenidium-like pattern.
[0009] Moreover, in the above-mentioned composition, a conductive layer may be transparent.
[0010] Moreover, in the above-mentioned composition, a glue line may be prepared as a layer which faces the stuck body.
[0011] Hereafter, it explains in more detail about this invention, referring to a drawing. The cross section in which drawing 1 shows one example of the pasting material for solar batteries of this invention, the cross section in which drawing 2 -5 show other examples of the pasting material for solar batteries of this invention, drawing 6 , and drawing 7 are the cross sections showing the formation method of a semiconductor ink layer of having used the pasting material for solar batteries of this invention. 1 -- a base-material film and 2 -- in a conductive layer and 5, an electrode and 6 show a glass substrate and, as for a semiconductor ink layer and 3, 7 shows a binder, respectively, as for a glue line and 4
[0012] As a base-material film 1, the good film of vaporization nature which consists of an acrylic resin, a hydrocarbon system resin, an acetal system resin, a vinyl system resin, a butyral system

resin, a styrene resin, a polyester system resin, an urethane system resin, etc. is used.
[0013] With a solvent, II-VI group compound semiconductor powder may be added to a resin binder, and the semiconductor ink layer 2 mixes and ink-izes it, and is formed by the coat methods, such as print processes, such as gravure, screen-stencil, offset printing, and Toppan Printing, and the roll coat method. There are CdS/CdTe, S/Cu(ZnCd) 2S, etc. as II-VI group compound semiconductor powder. As a resin binder, an acrylic resin, a hydrocarbon system resin, an acetal system resin, a vinyl system resin, a butyral system resin, a styrene resin, a polyester system resin, an urethane system resin, a nitrocellulose, etc. with sufficient vaporization nature are used.
[0014] Moreover, you may form a conductive layer 4 in one side or both sides of the semiconductor ink layer 2 so that the conductive layer 4 used as an electrode 5 may be formed on a glass substrate 6 simultaneously with the semiconductor ink layer 2. A conductive layer 4 can make large area which receives the sunlight of a semiconductor layer and which can carry out things by forming by the ctenidium-like pattern or forming transparently. As a conductive layer 4, what formed the metal or the conductive metallic oxide by the vacuum deposition method, the sputtering method, the ion plating method, etc. is used. Moreover, with a solvent, a metal or a conductive metallic oxide may be added to a resin binder, and may be mixed and ink-ized, and **** may be used for the thing and metallic foil which were formed by print processes, such as gravure, screen-stencil, offset printing, and Toppan Printing. Moreover, in obtaining the transparent conductive layer 4, it uses the tin oxide, indium oxide, tin-oxide-indium oxide, etc.
[0015] Moreover, you may form a glue line 3 as a layer which faces a transferred object. The good thing of vaporization nature is used as a glue line 3, and a binder 7 or the resin of a sensible-heat adhesive property and a pressure-sensitive adhesive property is used. As for a binder 7, it is good to use a rubber system binder, an acrylic binder, a vinyl alkyl system binder, etc. It is good for the resin of sensible-heat adhesion and a pressure-sensitive adhesive property to use acrylic resin, polyamide resin, a chlorination polypropylene regin, a vinyl chloride vinyl acetate system resin, etc. Moreover, a glue line 3 is formed by the coat methods, such as print processes, such as gravure, screen-stencil, offset printing, and Toppan Printing, and the roll coat method, the spray method, etc.
[0016]
[Example] The example 1 polyethylene-terephthalate film was used as the base-material film 1, the semiconductor ink layer 2 was formed with screen printing using the semiconductor ink mixed and obtained with the solvent in the resin binder which consists of acrylic resin by using CdS/CdTe as II-VI group compound semiconductor powder on it, the acrylic binder was further prepared as a glue line 3 on it, and the pasting material for solar batteries was produced.
[0017] Thus, the obtained pasting material for solar batteries was able to form the semiconductor ink layer 2 of uniform thickness on the glass substrate 6 which has a solid configuration by making it pile up and paste up so that the electrode 5 side of the glass substrate 6 which has the solid configuration in which the electrode 5 was formed in the front face may be met at a solid configuration.
[0018] The example 2 polypropylene film was used as the base-material film 1, the semiconductor ink layer 2 was formed with screen printing using the semiconductor ink mixed and obtained with the solvent in the resin binder which consists of acrylic resin by using CdS/CdTe as II-VI group compound semiconductor powder on it, further, vacuum deposition of the tin oxide was carried out, the transparent conductive layer 4 was formed on it, acrylic resin was prepared as a glue line 3 on it, and the pasting material for solar batteries was produced.
[0019] Thus, the obtained pasting material for solar batteries was able to form the semiconductor ink layer 2 of uniform thickness on the glass substrate 6 which has a solid configuration by piling up so that the glass substrate 6 which has a solid configuration may be met, applying heat and pressure and making it paste up.
[0020] The example 3 polyethylene-terephthalate film was used as the base-material film 1, on it, vacuum deposition of the aluminum was carried out, the conductive layer 4 was formed, the semiconductor ink layer 2 was formed with screen printing using the semiconductor ink mixed and obtained with the solvent in the resin binder which consists of acrylic resin by using CdS/CdTe as II-VI group compound semiconductor powder on it, further, vacuum deposition of the tin oxide was carried out, the transparent conductive layer 4 was formed on it, and the pasting material for solar

batteries was produced.
[0021] Thus, the obtained pasting material for solar batteries was able to form the semiconductor ink layer 2 of uniform thickness on the glass substrate 6 which has a solid configuration by making it pile up and paste up so that it may meet on a binder 7 application front face at a solid configuration, after applying the acrylic binder in the spray method on the glass substrate 6 which has a solid configuration.
[0022]
[Effect of the Invention] The pasting material for solar batteries of this invention was constituted as the semiconductor ink layer which makes a principal component II-VI group compound semiconductor powder and a resin binder was prepared at least on the base-material film which has detachability.
[0023] Therefore, the semiconductor ink layer of uniform thickness can be formed in the glass substrate which has solid sides, such as a curved surface, by making the pasting material for solar batteries which has a semiconductor ink layer meet a solid front face, and pasting it up.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] A semiconductor layer is put by the electrode of a couple and a solar battery transforms the light energy from the sun into electrical energy.
[0003] In order to have manufactured the II-VI group compound semiconductor solar battery from the former, semiconductor ink was used on the conductive layer used as the electrode formed in the glass-substrate front face, direct printing formation of the semiconductor ink layer of uniform thickness was carried out with screen printing, by calcinating a semiconductor ink layer after that, the organic component was vaporized and the semiconductor layer was formed.

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EFFECT OF THE INVENTION

[Effect of the Invention] The pasting material for solar batteries of this invention was constituted as the semiconductor ink layer which makes a principal component II-VI group compound semiconductor powder and a resin binder was prepared at least on the base-material film which has detachability.
[0023] Therefore, the semiconductor ink layer of uniform thickness can be formed in the glass substrate which has solid sides, such as a curved surface, by making the pasting material for solar batteries which has a semiconductor ink layer meet a solid front face, and pasting it up.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in print processes, such as screen-stencil, it was difficult to form a semiconductor ink layer on the glass substrate which has solid front faces, such as a curved surface.
[0005] Therefore, this invention aims at offering the pasting material for solar batteries which can form the semiconductor ink layer of uniform thickness on the glass substrate which has solid front faces, such as a curved surface.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the pasting material for solar batteries of this invention was constituted as the semiconductor ink layer which makes a principal component II-VI group compound semiconductor powder and a resin binder was prepared at least on the base-material film.
[0007] In the above-mentioned composition, a conductive layer may be prepared in one side or both sides of a semiconductor ink layer.
[0008] In the above-mentioned composition, the conductive layer may have the ctenidium-like pattern.
[0009] Moreover, in the above-mentioned composition, a conductive layer may be transparent.
[0010] Moreover, in the above-mentioned composition, a glue line may be prepared as a layer which faces the stuck body.
[0011] Hereafter, it explains in more detail about this invention, referring to a drawing. The cross section in which drawing 1 shows one example of the pasting material for solar batteries of this invention, the cross section in which drawing 2 -5 show other examples of the pasting material for solar batteries of this invention, drawing 6 , and drawing 7 are the cross sections showing the formation method of a semiconductor ink layer of having used the pasting material for solar batteries of this invention. 1 -- a base-material film and 2 -- in a conductive layer and 5, an electrode and 6 show a glass substrate and, as for a semiconductor ink layer and 3, 7 shows a binder, respectively, as for a glue line and 4
[0012] As a base-material film 1, the good film of vaporization nature which consists of an acrylic resin, a hydrocarbon system resin, an acetal system resin, a vinyl system resin, a butyral system resin, a styrene resin, a polyester system resin, an urethane system resin, etc. is used.
[0013] With a solvent, II-VI group compound semiconductor powder may be added to a resin binder, and the semiconductor ink layer 2 mixes and ink-izes it, and is formed by the coat methods, such as print processes, such as gravure, screen-stencil, offset printing, and Toppan Printing, and the roll coat method. There are CdS/CdTe, S/Cu(ZnCd) 2S, etc. as II-VI group compound semiconductor powder. As a resin binder, an acrylic resin, a hydrocarbon system resin, an acetal system resin, a vinyl system resin, a butyral system resin, a styrene resin, a polyester system resin, an urethane system resin, a nitrocellulose, etc. with sufficient vaporization nature are used.
[0014] Moreover, you may form a conductive layer 4 in one side or both sides of the semiconductor ink layer 2 so that the conductive layer 4 used as an electrode 5 may be formed on a glass substrate 6 simultaneously with the semiconductor ink layer 2. A conductive layer 4 can make large area which receives the sunlight of a semiconductor layer and which can carry out things by forming by the ctenidium-like pattern or forming transparently. As a conductive layer 4, what formed the metal or the conductive metallic oxide by the vacuum deposition method, the sputtering method, the ion plating method, etc. is used. Moreover, with a solvent, a metal or a conductive metallic oxide may be added to a resin binder, and may be mixed and ink-ized, and **** may be used for the thing and metallic foil which were formed by print processes, such as gravure, screen-stencil, offset printing, and Toppan Printing. Moreover, in obtaining the transparent conductive layer 4, it uses the tin oxide, indium oxide, tin-oxide-indium oxide, etc.
[0015] Moreover, you may form a glue line 3 as a layer which faces a transferred object. The good thing of vaporization nature is used as a glue line 3, and a binder 7 or the resin of a sensible-heat

adhesive property and a pressure-sensitive adhesive property is used. As for a binder 7, it is good to use a rubber system binder, an acrylic binder, a vinyl alkyl system binder, etc. It is good for the resin of sensible-heat adhesion and a pressure-sensitive adhesive property to use acrylic resin, polyamide resin, a chlorination polypropylene regin, a vinyl chloride vinyl acetate system resin, etc. Moreover, a glue line 3 is formed by the coat methods, such as print processes, such as gravure, screen-stencil, offset printing, and Toppan Printing, and the roll coat method, the spray method, etc.

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EXAMPLE

[Example] The example 1 polyethylene-terephthalate film was used as the base-material film 1, the semiconductor ink layer 2 was formed with screen printing using the semiconductor ink mixed and obtained with the solvent in the resin binder which consists of acrylic resin by using CdS/CdTe as II-VI group compound semiconductor powder on it, the acrylic binder was further prepared as a glue line 3 on it, and the pasting material for solar batteries was produced.
[0017] Thus, the obtained pasting material for solar batteries was able to form the semiconductor ink layer 2 of uniform thickness on the glass substrate 6 which has a solid configuration by making it pile up and paste up so that the electrode 5 side of the glass substrate 6 which has the solid configuration in which the electrode 5 was formed in the front face may be met at a solid configuration.
[0018] The example 2 polypropylene film was used as the base-material film 1, the semiconductor ink layer 2 was formed with screen printing using the semiconductor ink mixed and obtained with the solvent in the resin binder which consists of acrylic resin by using CdS/CdTe as II-VI group compound semiconductor powder on it, further, vacuum deposition of the tin oxide was carried out, the transparent conductive layer 4 was formed on it, acrylic resin was prepared as a glue line 3 on it, and the pasting material for solar batteries was produced.
[0019] Thus, the obtained pasting material for solar batteries was able to form the semiconductor ink layer 2 of uniform thickness on the glass substrate 6 which has a solid configuration by piling up so that the glass substrate 6 which has a solid configuration may be met, applying heat and pressure and making it paste up.
[0020] Let an example 3 polyethylene-terephthalate film be the base-material film 1. Vacuum deposition of the aluminum was carried out on it, the conductive layer 4 was formed, the semiconductor ink layer 2 was formed with screen printing using the semiconductor ink mixed and obtained with the solvent in the resin binder which consists of acrylic resin by using CdS/CdTe as II-VI group compound semiconductor powder on it, further, vacuum deposition of the tin oxide was carried out, the transparent conductive layer 4 was formed on it, and the pasting material for solar batteries was produced.
[0021] Thus, the obtained pasting material for solar batteries was able to form the semiconductor ink layer 2 of uniform thickness on the glass substrate 6 which has a solid configuration by making it pile up and paste up so that it may meet on a binder 7 application front face at a solid configuration, after applying the acrylic binder in the spray method on the glass substrate 6 which has a solid configuration.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the cross section showing one example of the pasting material for solar batteries of this invention.
[Drawing 2] It is the cross section showing other examples of the pasting material for solar batteries of this invention.
[Drawing 3] It is the cross section showing other examples of the pasting material for solar batteries of this invention.
[Drawing 4] It is the cross section showing other examples of the pasting material for solar batteries of this invention.
[Drawing 5] It is the cross section showing other examples of the pasting material for solar batteries of this invention.
[Drawing 6] It is the cross section showing the formation method of the semiconductor ink layer using the pasting material for solar batteries of this invention.
[Drawing 7] It is the cross section showing the formation method of the semiconductor ink layer using the pasting material for solar batteries of this invention.
[Description of Notations]
1 Base-Material Film
2 Semiconductor Ink Layer
3 Glue Line
4 Conductive Layer
5 Electrode
6 Glass Substrate
7 Binder

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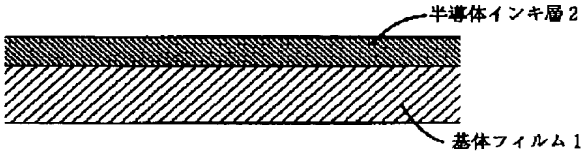
DRAWINGS

[Drawing 1]



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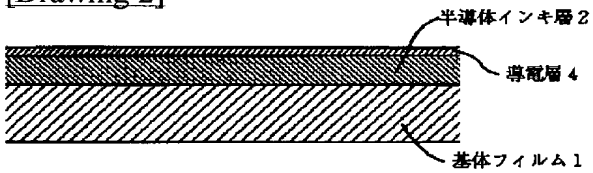

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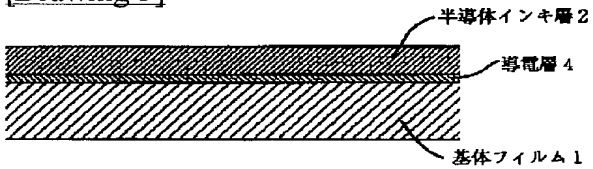

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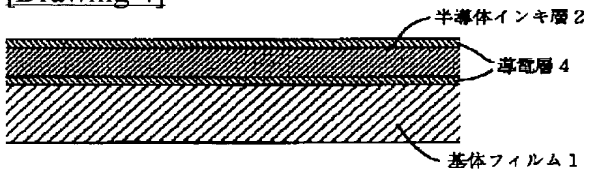

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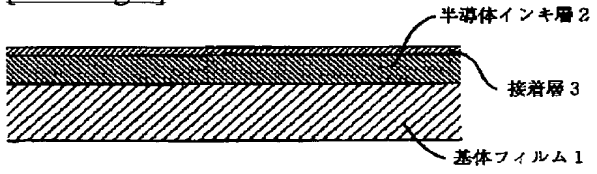

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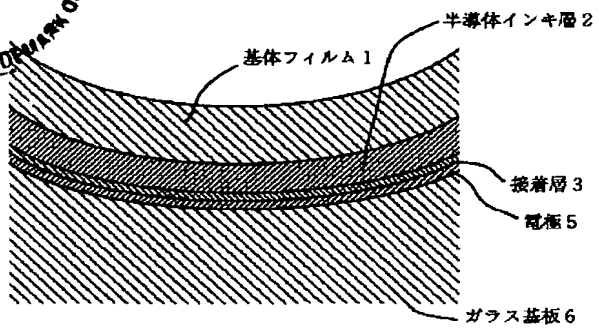
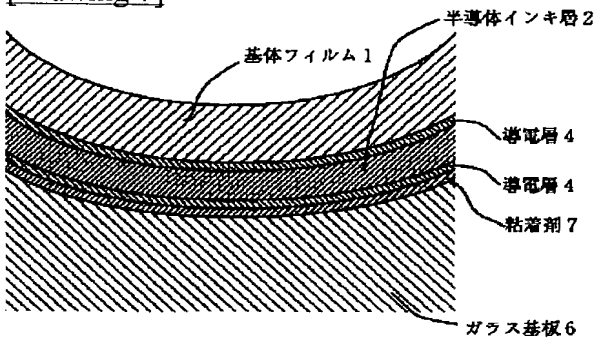


[Drawing 7]



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